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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/986,134

Applicant(s)

GOMEZ, RODOLFO ANTONIO

Examiner

Harry D Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: on page 7, references '12' and '14' have been switched (i.e. '12' in the drawing is the electrical connection with the inner electrode and '14' is the electrical connection with the outer electrode.

Appropriate correction is required.

Claim Objections

2. Claim 11 is objected to because of the following informalities: in lines 17-19, an electrical load is mentioned that is "connected to the outer electrode of the anode electrode and the negative terminal to the outer electrode of the cathode electrode". It is unclear as to what is actually being claimed (it appears that a cut and paste from claim 7 was done, but the reference to the negative terminal was not removed), but based on the specification at page 8 that the electrical load is connected to the outer electrode of the anode electrode and the outer electrode of the cathode electrode, and further examination will be based upon this assumption. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "high specific surface area" in claim 5 is a relative term which renders the claim indefinite. The term "high specific surface area" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what the Applicant is trying to claim about the surface area of the outer surface of the outer electrode. The specification does not add any further illumination as to what is meant by "high specific surface area". One of ordinary skill in the would not be able to ascertain the scope of claim 5 because no basis for the term "high" has been given.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1, 4, 6, 11 and 12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 16 and 19 of U.S. Patent No. 6,475,653. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '653 teach a compound (composite) electrode that has an inner electrical conductor and an outer electrical conductor with an electrically conductive material, an ionic or semiconductor membrane, sandwiched there between. Regarding claim 4, claim 3 of '653 recites that the sandwiched material is an ionic or semiconductor membrane. Regarding claim 6, claim 1 of '653 states that the outside of the electrodes are coated with a catalyst. Regarding claim 11, claim 1 of '653 states a fuel cell with an anode cell and a cathode cell and claim 3 of '653 states that the electrodes are of a composite (compound) type. Claims 1 and 3 of '653 state that the inner electrodes of the anode and cathode are connected and that the outer electrodes are connected to an electrical load. Claim 1 of '653 states that there are means to deliver a fuel to the anode cell and means to deliver an oxidant to the cathode cell. Claim 1 of '653 states the fuel cell has means to transfer the discharge of the anode cell to the cathode cell and means to transfer the discharge of the cathode cell to the anode cell. Regarding claim 12, claim 16 of '653 states that the fuel is hydrogen and claim 19 of '653 states that the oxidant is oxygen. Thus, the present invention is within the scope of claims 1, 3, 16 and 19 of US patent no. 6,475,653.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 4-6, 7, 11 and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gomez (WO 99/12220).

Gomez anticipates the invention as claimed. Gomez teaches (see page 11, lines 7-18 and figure 2) a composite electrode that has an inner electrical conductor 7, contained in an outer electrical conductor 5. There between is sandwiched an electrically conducting material 6, such as an ionic or semiconductor membrane. There are electrical leads 9 and 8 to the inner and outer electrodes, respectively.

Regarding claim 4, Gomez teaches (see page 11, lines 12-13) that the sandwiched material 6 is an ionic or semiconductor membrane.

Regarding claim 5, since Applicant has not defined the scope of the surface area, Gomez is deemed to meet the claimed limitation of having a "high specific surface area".

Regarding claim 6, Gomez teaches (see page 11, line 8) that the outside of the electrode is coated with a catalyst 4.

Regarding claim 7, Gomez teaches (see figure 4 and the paragraph spanning pages 11 and 12) an electrochemical cell having an anode cell 22 and a cathode cell 16, each with an electrode 17, which may be the composite electrode described above.

The electrochemical cell has a DC power source 21 connected to the second ends of the two electrodes (due to the direction of flow of electrons, the cathode cell must necessarily be attached to the negative terminal and the anode cell to the positive terminal). The second ends (B in figure 2) are attached to the outer electrode. The first ends (i.e.-inner electrodes) of the electrodes are electrically connected to each other, and the cell contains means to deliver electrolyte to the anode cell and means 18 to transfer the discharge of the anode cell to the cathode cell and means 19 to transfer the discharge of the cathode cell to the anode cell.

Regarding claim 11, Gomez teaches (see figure 4 and the paragraph spanning pages 11 and 12) a fuel cell having an anode cell 22 and a cathode cell 16, each with an electrode 17, which may be the composite electrode described above. The fuel cell has an electrical load 21 connected to the second ends of the two electrodes. The second ends (B in figure 2) are attached to the outer electrode. The first ends (i.e.-inner electrodes) of the electrodes are electrically connected to each other, and the cell contains means to deliver electrolyte to the anode cell and means 18 to transfer the discharge of the anode cell to the cathode cell and means 19 to transfer the discharge of the cathode cell to the anode cell. Gomez teaches (see claim 1) that the fuel cell contains means to supply fuel to the anode tank and an oxidant to the cathode tank.

Regarding claim 12, Gomez teaches (see claims 16 and 19) that the fuel was hydrogen and the oxidant was oxygen.

10. Claims 1, 4-6 and 9 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Mazanec et al (US 5,693,212).

Mazanec et al anticipate the invention as claimed. Mazanec et al teach (see Figs. 9 and 10 and col. 17, lines 27-46) a composite electrode with an inner electrode 52 and an outer electrode 53 with an electrically conductive material 51 sandwiched there between, with electrical leads 56 and 57 for inlet and outlet of electrons.

Regarding claim 4, Mazanec et al teach (see col. 17, lines 27-46) that the electrically conductive material was a multi-component membrane.

Regarding claim 5, since Applicant has not defined the scope of the surface area, Mazanec et al is deemed to meet the claimed limitation of having a "high specific surface area".

Regarding claim 6, Mazanec et al teach (see col. 17, lines 47-55) that a catalyst coating may be applied to the surface of the cathode (outer electrode).

Regarding claim 9, Mazanec et al teach (see Figs. 9 and 10 and col. 17, lines 27-46) an anode cell 54 located with the inner electrode and a cathode cell 55 surrounding the outer electrode. Mazanec et al disclose a battery (i.e.-DC power source) connected to the leads (due to the direction of flow of electrons, the cathode cell must necessarily be attached to the negative terminal and the anode cell to the positive terminal). Though Mazanec et al do not expressly disclose that there are means for feeding and withdrawing each of the anolyte and catholyte, the apparatus inherently possesses such means as there must be some way of adding the anolyte and catholyte to be processed and to evacuate the processed anolyte and catholyte so that the apparatus can be continued to be operated.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez (WO 99/12220) in view of Mekjean et al (US 3,293,159).

The teachings of Gomez are described above in paragraph no. 9. However, Gomez do not teach using the compound/composite electrode in a unipolar activation cell as claimed.

Mekjean et al teach (see Figure 1 and paragraph spanning cols. 5 and 6) an electrochemical apparatus with an anode cell 5, a cathode cell 6, a positive terminal of a DC power source being connected to the anode 3 and the negative terminal connected to the cathode 4, and means to supply and withdraw anolyte from the anode cell and means to supply and withdraw catholyte from the cathode cell.

Mekjean et al do not teach that the apparatus is of a unipolar type, however, it would have been obvious to one of ordinary skill in the art to have modified the apparatus of Mekjean et al by separating the anode cell and cathode cell in order to produce charged anolyte and catholyte. See MPEP 2144.04.V.C and *In re Dulberg* 289 F.2d 522, 129 USPQ 348, 349 (CCPA 1961). It would have been obvious to one of ordinary skill in the art to have added means for completing the electrical circuit, such as by adding a wire connecting the two ends of the anode and cathode.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the compound/composite electrode of Gomez in the electrochemical cell of Mekjean et al because the composite electrode provides the best power output (see Gomez at page 3, lines 11-14) for the disclosed electrode designs.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al (US 5,693,212).

The teachings of Mazanec et al are described above in paragraph no. 10. Though there is no express disclosure in Figs. 9 and 10 of insulating end caps, the pictures in figs. 9 and 10 do not include the full apparatus.

Thus, it would have been within the expected skill of a routineer in the art to have added end caps so as to contain the anolyte and catholyte and also to make the end caps insulating to prevent charge leakage between the anode and cathode. In addition, it would have been within the expected skill of a routineer in the art to have adapted the means for feeding the anolyte to feed the anolyte in any conventional manner, such as tangentially. (see Gomez US 5,882,502, especially Fig. 4A, for support that tangential feeding was conventional).

14. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez (WO 99/12220) in view of Meyers et al (US 3,708,220).

The teachings of Gomez are described above in paragraph no. 9.

Gomez does not teach that the sandwiched electrically conductive material is a gel or liquid.

Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Gomez because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

15. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al (US 5,693,212) in view of Meyers et al (US 3,708,220).

The teachings of Mazanec et al are described above in paragraph no. 10.

Mazanec et al do not teach that the sandwiched electrically conductive material is a gel or liquid.

Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Mazanec et al because

Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
May 29, 2003

ROY KING
SUPERVISOR, PATENT EXAMINER
FEDERAL BUREAU OF INVESTIGATION